

WHAT IS CLAIMED IS:

1. A therapeutic agent comprising a bone sialoprotein ("BSP") promoter, a delivery vector and a toxic, therapeutic and/or heterologous coding sequence.

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2. The therapeutic agent of claim 1, further comprising a prodrug.

3. The therapeutic agent of claim 2, wherein said prodrug is selected from the group consisting of acyclovir ("ACV") and gancyclovir ("GCV").

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4. The therapeutic agent of claim 1, further comprising a glucocorticoid or an L-ascorbic acid.

5. The therapeutic agent of claim 1, wherein said BSP promoter comprises  
15 nucleotides -1349 to +69 depicted in Figure 8.

6. The therapeutic agent of claim 1, wherein said delivery vector comprises a viral vector.

20 7. The therapeutic agent of claim 6, wherein said viral vector is an adenovirus.

8. The therapeutic agent of claim 1, wherein said delivery vector comprises a liposome.

25 9. The therapeutic agent of claim 1, wherein said toxic coding sequence is selected from the group consisting of thymidine kinase and cytosine deaminase.

10. The therapeutic agent of claim 1, wherein said therapeutic coding sequence is selected from the group consisting of growth factors, cytokines, therapeutic proteins,  
30 hormones and peptide fragments of hormones, inhibitors of cytokines, peptide growth and differentiation factors, interleukins, chemokines, interferons, colony stimulating factors and angiogenic factors.

11. The therapeutic agent of claim 1, wherein said heterologous coding sequence  
35 is a reporter gene.

12. The therapeutic agent of claim 11, wherein said reporter gene is a luciferase.
13. A method for identifying a test compound capable of modulating osteotropic-specific gene expression comprising:
- 5 (a) measuring the level of expression of a reporter gene under the control of a BSP regulatory region, or a transcriptionally active fragment thereof, in the presence and absence of said test compound, such that if the level obtained in the presence of the test compound differs from that obtained in its absence, then a compound which modulates osteotropic-specific gene
- 10 expression is identified.
14. The method of claim 13 wherein the reporter gene is luciferase.
- 15 15. A pharmaceutical composition comprising the test compound identified by the method in claim 13.
16. A method for delivery of a toxic and/or therapeutic molecule comprising, introducing into osteotropic cells of a subject a vector comprising a BSP regulatory region sequence, or transcriptionally active fragment thereof, operatively linked to a heterologous
- 20 nucleic acid which encodes said toxic and/or therapeutic molecule.
17. A method for treating and/or ameliorating an osteotropic-related disease or disorder comprising introducing into osteotropic cells of a subject a vector comprising a BSP regulatory region sequence, or transcriptionally active fragment thereof, operatively
- 25 linked to a heterologous nucleic acid whose gene product is capable of treating and/or ameliorating said disease or disorder.
18. A method for treating and/or ameliorating an osteotropic-related cancer or other proliferative disorder comprising introducing into a cell of said cancer or other
- 30 proliferative disorder of a subject a vector comprising a BSP regulatory region sequence, or transcriptionally active fragment thereof, a delivery vector and a toxic, therapeutic and/or heterologous coding sequence whose gene product is capable of killing said cell.
19. The method of claim 18 wherein said cancer or other proliferative disorder
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is selected from the group consisting of osteosarcoma, prostate, breast, colon, lung, brain, multiple myeloma, thyroid, melanoma or any other disease or disorder with calcification potential.

5           20.     The method of claim 18 further comprising introducing a prodrug.

          21.     The method of claim 20 wherein said prodrug is selected from the group consisting of ACV and GCV.

10          22.     The method of claim 20 wherein said introducing comprises administration via direct application, or systemic application via intravenous administration, intra-arterial administration, intra-tumoral administration, perfusion and oral administration.

          23.     The method of claim 18, wherein said BSP regulatory region sequence  
15 comprises nucleotides -1349 to +69 depicted in Figure 8.

          24.     The method of claim 23, wherein said BSP regulatory region sequence comprises a nucleotide sequence which hybridizes under highly stringent conditions to the complement of nucleotides -1349 to +69 depicted in Figure 8.

20          25.     The method of claim 23, wherein said BSP regulatory region sequence comprises a nucleotide sequence which hybridizes under moderately stringent conditions to the complement of nucleotides -1349 to +69 depicted in Figure 8.

25          26.     A method for preventing or delaying an osteotropic-related disorder comprising introducing into osteotropic cells of a subject a vector comprising a BSP regulatory region sequence, or transcriptionally active fragment thereof, operatively linked to a heterologous nucleic acid which encodes a therapeutic molecule which is capable of preventing or delaying said disorder.

30          27.     A method for promoting bone repair comprising administering a polynucleotide to an area where bone repair is necessary, wherein said polynucleotide comprises a BSP regulatory region sequence, or transcriptionally active fragment thereof, a delivery vector and therapeutic coding sequence whose gene product is capable of  
35 promoting said bone repair.

28. The method of claim 27, wherein said therapeutic coding sequence is selected from the group consisting of growth factors, cytokines, therapeutic proteins, hormones and peptide fragments of hormones, inhibitors of cytokines, peptide growth and differentiation factors, interleukins, chemokines, interferons, colony stimulating factors and angiogenic factors.

29. A method for modulating immune functions comprising administering a polynucleotide to an area where modulation of immune function is necessary, wherein said polynucleotide comprises a BSP regulatory region sequence, or transcriptionally active fragment thereof, a delivery vector and therapeutic coding sequence whose gene product is capable of modulating immune functions.

30. The method of claim 29, wherein said therapeutic coding sequence is selected from the group consisting of interferons alpha, beta or gamma; tumour necrosis factor; granulocyte-macrophage colony-stimulating factor (GM-CSF), granulocyte colony-stimulating factor (G-CSF), macrophage colony-stimulating factor (M-CSF), chemokines such as neutrophil activating protein NAP, macrophage chemoattractant and activating factor MCAF, RANTES, macrophage inflammatory peptides MIP-1a and MIP-1b, complement components and their receptors, accessory molecules such as 87.1, 87.2, ICAM-1.2 or 3 or cytokine receptors.